

PATENT ABSTRACTS OF JAPAN

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(54) RECORDING AND REPRODUCING DEVICEITS METHOD AND RECORDING MEDIUM

(57)Abstract:

PROBLEM TO BE SOLVED: To record information representing a detected change by detecting a change in the recorded video and audio data for an idle time when recording and reproduction of video and audio data are not conducted.

SOLUTION: Video and audio data reproduced from a recording medium 5 are to a reproduction data processing system 31in which the data are separated into video dataaudio data and additional informationthe video data are expanded in a video signal band expansion processing system 32a change in the video data is detected by a video signal detection control system 38from which the corresponding additional information is outputted. Furthermorethe audio data are expanded by an audio signal band expansion processing system 41a change in the audio data is detected by an audio signal detection control system 42from which the corresponding additional information is outputted. The additional information is fed to a recording systemwhere the information is recorded on the recording medium 5.

CLAIMS

[Claim(s)]

[Claim 1]Have the following and independently with record to said recording medium of said signal by said 1st recording device said reproduction meansReproduce and said signal recorded on said recording medium said detection meansA recording and reproducing device which detects change of said signal reproduced by said reproduction meansand is characterized by said 2nd recording device's matching with said signal information which shows change of said signaland recording it on said recording medium when change of said signal is detected by said detection means.

An input means which inputs 1 or two or more signals.

The 1st recording device that records said signal inputted by said input means on a predetermined recording medium.

A reproduction means which reproduces said signal recorded on said recording medium by said 1st recording device.

A detection means to detect change of said signal reproduced by said reproduction means and the 2nd recording device that matches with said signal information which shows change of said signal and is recorded on said recording medium when change of said signal is detected by said detection means.

[Claim 2]The recording and reproducing device according to claim 1 having further a providing means which provides a signal with which change was detected according to access from the outside by said detection means.

[Claim 3]The recording and reproducing device according to claim 1 having further a display control means which displays a list of information which shows change of said signal detected by said detection means on a predetermined screen.

[Claim 4]The recording and reproducing device according to claim 1 with which said signal is characterized by said detection means detecting change of said video signal including a video signal.

[Claim 5]The recording and reproducing device according to claim 1 with which said signal is characterized by said detection means detecting change of said audio signal including an audio signal.

[Claim 6]When change of said signal is not detected by said detection means as for said 2nd recording device Match with said signal record information which shows that it can overwrite on said recording medium and said 1st recording device The recording and reproducing device according to claim 1 overwriting a new signal if needed to a field to which said signal with which said information which shows that overwrite of said recording medium is possible is matched is recorded.

[Claim 7]An input means which inputs 1 or two or more signals.

The 1st recording device that records said signal inputted by said input means on a predetermined recording medium.

A reproduction means which reproduces said signal recorded on said recording medium by said 1st recording device.

A detection means to detect change of said signal reproduced by said reproduction means. The 2nd recording device that matches with said signal information which shows change of said signal and is recorded on said recording medium when change of said signal is detected by said detection means.

With record to said recording medium of 1 which is recording and reproducing systems provided with the above and was inputted or two or more of said signals independently When said signal recorded on said recording medium is reproduced change of said reproduced signal is detected and change of said signal is detected information which shows change of said signal is matched with said signal and it records on said recording medium.

[Claim 8]A recording and reproducing device comprising:

An input means which inputs 1 or two or more signals.

A detection means to detect change of said signal inputted by said input means.

An image recording means which records said video signal on a predetermined recording medium when change of a video signal which constitutes said signal by said detection

means is detected.

A voice recording means for a level of an audio signal which constitutes said signal by said detection means to be beyond a predetermined reference value and to record said sound on said recording medium while said audio signal is changing within a predetermined base period.

[Claim 9] When 1 or two or more signals are inputted, change of said inputted signal is detected and change of a video signal which constitutes said signal is detected. Recording and reproducing systems recording said video signal on a predetermined recording medium and recording said sound on said recording medium while a level of an audio signal which constitutes said signal is beyond a predetermined reference value and said audio signal is changing within a predetermined base period.

[Claim 10] Information which shows change of picture image data, voice data, and said picture image data at least a recording medium wherein information which shows change of information which shows change of said voice data is recorded and shows change of said picture image data and said voice data is matched and recorded on said picture image data and said voice data.

DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention detects change of video information or speech information concerning a recording and reproducing device, a method, and a recording medium and relates to the recording and reproducing device which enabled it to carry out record reproduction efficiently [for the purpose of video information or speech information] using the information, a method, and a recording medium.

[0002]

[Description of the Prior Art] Conventionally, the video system for surveillance records the image and sound which were inputted from the surveillance camera on videotape, for example.

Then, he reproduces it and is trying to check the contents.

At the time of record of an image or a sound, change of an image is detected and it is related with an image or a sound and is recorded.

Then, when checking the contents, enabling it to search the image and sound at the time of change of an image being detected is proposed.

[0003] In VTR (video tape recorder) which carries out recording playback of the usual program, the change (scene change) of a scene is detected or commercials (CM) are detected and it considers that it is made not to perform playback or recording of CM. It considers compressing and recording an image on recording media such as an optical disc in which random access is possible, a hard disk or a memory card in recent years.

[0004]

[Problem(s) to be Solved by the Invention] However, since the video system for surveillance had the different characteristic from VTR which carries out record

reproduction of the usual program and operation forms also differed the technical problem used as the independent system occurred.

[0005] This invention is made in view of such a situation makes the function to carry out record reproduction of the usual program and to search it and a monitoring function serve a double purpose and enables it to perform more efficiently record of various video voice data reproduction and search.

[0006]

[Means for Solving the Problem] An input means as which the recording and reproducing device according to claim 1 inputs 1 or two or more signals The 1st recording device that records a signal inputted by an input means on a predetermined recording medium A reproduction means which reproduces a signal recorded on a recording medium by the 1st recording device When change of a signal is detected by detection means to detect change of a signal reproduced by reproduction means and a detection means Have the 2nd recording device that matches with a signal information which shows change of a signal and is recorded on a recording medium and independently record to a recording medium of a signal by the 1st recording device a reproduction means A signal recorded on a recording medium is reproduced a detection means detects change of a signal reproduced by reproduction means and when change of a signal is detected by a detection means the 2nd recording device matches with a signal information which shows change of a signal and records it on a recording medium.

[0007] The recording and reproducing systems according to claim 7 with record to an inputted recording medium of 1 or two or more signals independently When a signal recorded on a recording medium is reproduced change of a reproduced signal is detected and change of a signal is detected information which shows change of a signal is matched with a signal and it records on a recording medium.

[0008] written this invention is characterized by it having been alike and comprising the following at claim 8.

An input means which inputs 1 or two or more signals.

A detection means to detect change of a signal inputted by an input means.

An image recording means which records a video signal on a predetermined recording medium when change of a video signal which constitutes a signal by a detection means is detected.

A voice recording means for a level of an audio signal which constitutes a signal by a detection means to be beyond a predetermined reference value and to record a sound on a recording medium while an audio signal is changing within a predetermined base period.

[0009] When the recording and reproducing systems according to claim 9 input 1 or two or more signals change of an inputted signal is detected and change of a video signal which constitutes a signal is detected A video signal is recorded on a predetermined recording medium and while a level of an audio signal which constitutes a signal is beyond a predetermined reference value and an audio signal is changing within a predetermined base period a sound is recorded on a recording medium.

[0010] At least the recording medium according to claim 10 Picture image data and voice data Information which shows change of information and voice data in which information which shows change of picture image data and information which shows change of voice data are recorded and change of picture image data is shown is matched and recorded on

picture image data and voice data.

[0011] In the recording and reproducing device according to claim 1 an input means inputs 1 or two or more signals. The 1st recording device records a signal inputted by an input means on a predetermined recording medium. A reproduction means reproduces a signal recorded on a recording medium by the 1st recording device. When a detection means detects change of a signal reproduced by reproduction means, the 2nd recording device matches with a signal information which shows change of a signal when change of a signal is detected by a detection means and it records on a recording medium. With record to a recording medium of a signal by the 1st recording device, independently a reproduction means reproduces a signal recorded on a recording medium. A detection means detects change of a signal reproduced by reproduction means and when change of a signal is detected by a detection means, the 2nd recording device matches with a signal information which shows change of a signal and records it on a recording medium.

[0012] In the recording and reproducing systems according to claim 7 with record to an inputted recording medium of 1 or two or more signals, independently. When a signal recorded on a recording medium is reproduced, change of a reproduced signal is detected and change of a signal is detected in information which shows change of a signal is matched with a signal and it records on a recording medium.

[0013] In the recording and reproducing device according to claim 8 an input means inputs 1 or two or more signals. When a detection means detects change of a signal inputted by an input means and change of a video signal from which an image recording means constitutes a signal by a detection means is detected, a video signal is recorded on a predetermined recording medium. A voice recording means is beyond a reference value predetermined in a level of an audio signal which constitutes a signal by a detection means and while an audio signal is changing within a predetermined base period, a sound is recorded on a recording medium.

[0014] When 1 or two or more signals are inputted, change of an inputted signal is detected in the recording and reproducing systems according to claim 9 and change of a video signal which constitutes a signal is detected. A video signal is recorded on a predetermined recording medium. A level of an audio signal which constitutes a signal is beyond a predetermined reference value and while an audio signal is changing within a predetermined base period, a sound is recorded on a recording medium.

[0015] In the recording medium according to claim 10 at least Picture image data, Information which shows change of information and voice data in which voice data, information which shows change of picture image data and information which shows change of voice data are recorded and change of picture image data is shown is matched and recorded on picture image data and voice data.

[0016]

[Embodiment of the Invention] Drawing 1 is a block diagram showing the example of composition of the 1 embodiment of the video voice recording and reproducing device which applied the recording and reproducing device of this invention. The record signal-processing system 1 changes into digital picture image data and voice data the video signal and audio signal which were inputted respectively and is made as [perform / compression processing]. The signal detection system 2 detects change of picture image data and is made as [output / the information which shows it]. The record signal-processing system 1 is made as [record / match the information outputted from the signal

detection system 2 with the picture image data which changed and / it / on the recording medium 5 (reproduction means) / as additional information (ID)].

[0017]The regenerative-signal processor 3 is made as [divide / into picture image data and voice data and additional information / the reproduced data]. And an expansion process is performed to picture image data and voice data and it is made as [change / into an analog signal]. The signal detection system 4 detects change of picture image data and is made as [output / the information which shows it]. The regenerative-signal processor 3 is made as [record / match the information outputted from the signal detection system 4 with the picture image data which changed and / it / on the recording medium 5 / as additional information].

[0018]The recording medium 5 is constituted by a hard disk and optical disc memory card etc. and is made as [record / by control of the system controller 7 mentioned later / the signal supplied from the record signal-processing system 1]. The recorded data is reproduced and it is made as [supply / the regenerative-signal processor 3].

[0019]The recording control signal input system 6 is constituted by the keyboard etc. and is made as [supply / to the system controller 7 / the recording control signal corresponding to the key operation which the user inputted]. The reproduction control signal input system 8 is constituted by a keyboard mouse etc. and is made as [supply / to the system controller 7 / the reproduction control signal corresponding to the key operation which the user inputted]. ROM the system controller 7 remembers a predetermined control program to be (read only memory) It comprises a CPU (central processing unit) etc. which perform processing according to a control program and is made as [control / according to the control signal inputted from the recording control signal input system 6 or the reproduction control signal input system 8 / each part].

[0020]The record signal-processing system 1 the signal detection system 2 the recording medium 5 the recording control signal input system 6 the reproduction control signal input system 8 and the system controller 7 Constituting a recording system the regenerative-signal processor 3 the signal detection system 4 the recording medium 5 the recording control signal input system 6 the reproduction control signal input system 8 and the system controller 7 constitute the reversion system.

[0021]Drawing 2 is a block diagram showing the example of composition of the recording system shown in drawing 1. The video-signal processor 11 (input means) is made as [output / it / return the video signal inputted from VTR etc. to a baseband signal and]. The camera-signal-processing system 12 (input means) is made as [output / it / return the video signal inputted from the video camera etc. to a baseband signal and]. The tuner system 13 (input means) is made as [output / them / return the video signal and audio signal which were inputted via the antenna to a baseband signal and].

[0022]The video-signal change system 14 is made according to control of the system controller 7 as [switch / if needed / the signal supplied from the video-signal processor 11 the camera-signal-processing system 12 and the tuner system 13]. The video-signal A/D conversion system 15 is made as [change / into digital picture image data / the video signal inputted from the video-signal change system 14]. The video-signal detection control system 16 (detection means) detects change of picture image data and is made as [output / additional information (ID) including the information which shows it]. The video-signal-band compression processor 17 is made as [output / to the inputted picture image data / the compression processing by methods such as MPEG (Moving Picture

Experts Group)/ perform and].

[0023]The speech-signal-processing system 18 (input means) adjusts the level of an audio signal etc. which were inputted from VTR etc. and is made as [output]. The mike input speech processing system 19 (input means) adjusts the level of an audio signal etc. which were inputted from microphones such as a video camera and is made as [output]. The audio signal change system 20 is made according to control of the system controller 7 as [switch / if needed / the audio signal supplied from the tuner system 13 the speech-signal-processing system 18 and the mike input speech processing system 19].

[0024]The audio signal A/D conversion system 21 is made as [output / it / change the inputted audio signal into digital voice data and]. The audio signal detection control system 22 (detection means) is made as [output / detect change of the inputted voice data and / corresponding additional information]. The audio signal bandwidth compression processor 23 is made as [output / the inputted voice data / compress and].

[0025]The record data processing system 24 (the 1st recording device the 2nd recording device an image recording means voice recording means) It is made as [output / the additional information supplied from the picture image data the voice data from the audio signal bandwidth compression processor 23 the video-signal detection control system 16 and the audio signal detection control system 22 from the video-signal-band compression processor 17 / superimpose and].

[0026]Next when recording the inputted video voice signal change of an image is detected simultaneously and the operation in the case of recording as ID which has the format which mentions it later with reference to drawing 7 is explained.

[0027]After the video signal from VTR etc. which were inputted into the video-signal processor 11 is returned to baseband signals such as YUV it is supplied to the video-signal change system 14. After the video signal supplied to the camera-signal-processing system 12 is returned to baseband signals such as YUV it is supplied to the video-signal change system 14. After the signal of a predetermined broadcasting station tunes in the signal inputted into the tuner system 13 from the antenna it is returned to baseband signals such as YUVA video signal is supplied to the video-signal change system 14 and an audio signal is supplied to the audio signal change system 20.

[0028]The audio signal from VTR etc. which were inputted into the speech-signal-processing system 18 is supplied to the audio signal change system 20 after a level etc. are adjusted. The audio signal inputted from the microphone of the video camera etc. is supplied to the audio signal change system 20 after a level etc. are adjusted by the mike input speech processing system 19.

[0029]Those either is switched by control of the system controller 7 and the video signal from the video-signal processor 11 the camera-signal-processing system 12 and the tuner system 13 supplied to the video-signal change system 14 is outputted. In the video-signal A/D conversion system 15 after the video signal outputted from the video-signal change system 14 is changed into digital picture image data it is supplied to the video-signal detection control system 16.

[0030]In the video-signal detection control system 16 based on a histogram inter-frame difference a motion vector etc. change of an image is detected so that it may mention later with reference to drawing 4. And the additional information which shows change of an image is supplied to the record data processing system 24. Picture image data is supplied to the video-signal-band compression processor 17. The picture image data supplied to

the video-signal-band compression processor 17 is supplied to the record data processing system 24 after compression processing by compression methods such as MPEG is performed.

[0031] On the other hand, the either is switched and outputted according to control of the system controller 7 and the audio signal supplied to the audio signal change system 20 from the tuner system 13, the speech-signal-processing system 18 and the mike input speech processing system 19 is supplied to the audio signal A/D conversion system 21. After the audio signal supplied to the audio signal A/D conversion system 21 is changed into digital voice data, it is supplied to the audio signal detection control system 22. In the audio signal detection control system 22, an audio change is detected and the additional information which shows an audio change is supplied to the record data processing part 24. Voice data is supplied to the audio signal bandwidth compression processor 23. The voice data supplied to the audio signal bandwidth compression processor 23 is supplied to the record data processing system 24 after compression processing by compression methods such as MPEG is performed.

[0032] The picture image data from the video-signal-band compression processor 17 is supplied to the record data processing system 24. After the voice data from the additional information and the audio signal bandwidth compression processor 23 from the video-signal detection control system 16 and the audio signal detection control system 22 is superimposed, it is supplied to the recording medium 5 and it is recorded by a predetermined recording form so that it may be mentioned later with reference to drawing 8. Additional information is associated and recorded on picture image data and voice data as ID which has the predetermined format which consists of additional information, a character code, etc. so that it may be mentioned later with reference to drawing 7.

[0033] Change of the video signal and audio signal which were inputted as mentioned above is detected and ID (additional information) including the information showing the change relates and is recorded on a video signal and an audio signal.

[0034] Drawing 3 is a block diagram showing the example of composition of the reversion system of the video voice recording and reproducing device of drawing 1. The regenerative data processor 31 is made as [divide / into picture image data, voice data and additional information / the data reproduced from the recording medium 5]. The video-signal-band expansion process system 32 is made as [perform / to the video signal by which compression processing was carried out / by MPEG etc. / an expansion process]. The video-signal detection control system 38 (detection means) detects change of picture image data and is made as [output / the additional information which consists of information which shows it]. The video-signal D/A conversion system 39 is made as [change / into the video signal of an analog / the inputted picture image data]. The video-signal-outputs processor 40 is made as [output / the inputted video signal / encode and].

[0035] The audio signal zone expansion process system 41 is made as [elongate / the voice data by which compression processing was carried out by MPEG etc.]. The audio signal detection control system 42 (detection means) is made as [supply / to the audio signal D/A conversion system 43 / voice data] while detecting change of the inputted voice data and outputting it. The audio signal D/A conversion system 43 is made as [change / into the audio signal of an analog / the inputted voice data]. The voice signal output processor 44 is made as [output / the inputted audio signal / encode and].

[0036]The option processor 45 (a providing meansdisplay control means)The information which shows that ID supplied from the regenerative data processor 31i.e.an imageand a sound changedAnd the image which changed is searched based on picture image data and voice dataand the video signal corresponding to a retrieval picture is createdand the video-signal-outputs processor 40 is suppliedor it is made as [transmit / picture image datavoice dataand ID / outside] via the telephone line and the network.

[0037]Drawing 4 is a block diagram showing the example of composition of the video-signal detection control systems 16 and 38 shown in drawing 2 and drawing 3. The histogram difference detection block 51 creates the histogram of the pixel level of each pixel which constitutes each screen for every color component of the inputted picture image datacalculates a difference with the histogram of the screen in front of oneand is made as [output / a calculation result].

[0038]The inter-frame difference detection block 52 comprises a frame memory etc. which memorize picture image datacalculates the difference of the inputted picture image data and the picture image data delayed by one framecalculates accumulation of the difference quantity furtherand is made as [output / the result of an operation].

[0039]The motion vector detection block 53 asks for the representative point of a predetermined frameand the representative point of the frame in front of oneand is made as [output / the motion vector which detected and detected the inter-frame motion vector from the difference of the position of the representative point of each frame with what is called a representative point matching system].

[0040]As opposed to the detection result to which the detection judgment part 54 is supplied from the histogram detection block 51the inter-frame difference detection block 52and the motion vector detection block 53A predetermined threshold is set uprespectivelyit is judged as that from which the inputted picture image data changed when the detection result exceeding a threshold was obtainedthe information which shows thatand ID including a detection result are generatedand it is made as [supply / the option processor 45].

[0041]Drawing 5 is a block diagram showing the example of composition of the audio signal detection control systems 22 and 42 shown in drawing 2 and drawing 3. It judges that the level variation detection block 61 had change of a sound level when detected the inputted voice dataa level was detecteda level was compared at intervals of each frame and difference aroseand is made as [output / it / include the information which shows it in ID and].

[0042]The phase reference detection block 62 judges at least L(left)-R (right) to be that from which voice data changed when the inputted voice data was a stereothe difference of the volume between LR arose or phase relation changedand it is made as [output / it / include in ID the data in which that is shownand]. The difference (ΔS) of the volume between LR can be searched forfor example with a following formula.

[0043] $\Delta S = (L_1 - R_1) - (L_2 - R_2)$

[0044]the voice data in the frame into which L_1 and R_1 were inputted now in the above-mentioned formula -- the left -- (-- L) -- the right -- (-- the volume of R) is expressedrespectively and L_2 and R_2 express the volume of the right and left of the voice data in the frame of one frame agorespectively.

[0045]To the voice data in each inputted framethe spectrum difference detection block 63 performs FFT computationand detects a spectrum. And when a difference arises in the

voice spectrum of each frame it is judged as that from which voice data changed and is made as [output / ID including the information which shows that].

[0046] Drawing 6 is a block diagram showing the example of composition of the option processor 45 shown in drawing 3. The ID discrimination control section 71 is made as [input / from the regenerative data processor 31 / ID]. The recording-medium interface 72 is made as [input / ID from the regenerative data processor 31 picture image data voice data etc.].

[0047] CPU (central processing unit) 73 It is made as [control / according to the control program memorized by the storage parts store 74 constituted by ROM (read only memory) RAM (random access memory) etc. / each part]. It is made as [supply / to the controlling-display part 75 / the data corresponding to a retrieval picture]. The controlling-display part 75 is made as [output / to the video-signal-outputs system 40 / the RGB code corresponding to the retrieval picture which was memorized to the frame memory which builds in the data corresponding to the retrieval picture supplied from CPU 73 and was memorized to the frame memory a YUV signal etc.].

[0048] ID to which the modem network control section 76 was supplied by control of CPU 73 from the ID discrimination control section 71 Or it is made as [transmit / ID picture image data and voice data which were supplied from the recording-medium interface 72 / via a network / to other host computers / via a telephone line etc.].

[0049] I/O control unit 77 is made as [output / picture image data voice data and ID / outside] via a serial bus a parallel bus etc.

[0050] Next record a video signal and an audio signal on the recording medium 5 and the record reproduction to the recording medium 5 at the idle time which is not performed as background processing Change of the picture image data and voice data which were recorded on the recording medium 5 is detected and the operation in the case of recording on the recording medium 5 by setting to ID the information which shows it is explained.

[0051] The picture image data voice data and additional information which were reproduced from the recording medium 5 are supplied to the regenerative data processor 31. The video voice data and additional information which were supplied to the regenerative data processor 31 are divided into picture image data voice data and additional information picture image data is supplied to the video-signal-band expansion process system 32 and voice data is supplied to the audio signal zone expansion process system 41. Additional information is supplied to the option processor 45.

[0052] After being elongated and changing into the original picture image data the picture image data supplied to the video-signal-band expansion process system 32 it is supplied to the video-signal detection control system 38. Change of the elongated picture image data is detected in the video-signal detection control system 38. That is in the histogram difference detection block 51 the difference of an inter-frame histogram is detected and a detection result is supplied to the detection judgment part 54. In the inter-frame difference detection block 52 the difference for every pixel of inter-frame picture image data is taken and the accumulation about all the pixels calculates. And accumulation of the difference quantity is supplied to the detection judgment part 54 as a detection result. It is also possible to divide one frame into two or more areas to calculate accumulation of a difference quantity for every area and to detect the change in predetermined area instead of calculating one-frame the accumulation of an about of the whole at this time. In the motion vector detection block 53 an inter-frame motion vector is detected and a detection

result is supplied to the detection judgment part 54.

[0053]In the detection judgment part 54it is judged whether the inputted video signal changed based on the detection result supplied from the histogram detection block 51the inter-frame difference detection block 52and the motion vector detection block 53. For examplewhen a motion vector is detected by the motion vector detection block 53it is judged that the photographic subject moved. When change of a histogram is detected by the histogram detection block 51 and a motion vector is not detected for exampleit is judged that the luminosity of the photographic subject changed.

[0054]And a decision result is included in ID (additional information) which has a format as shown in drawing 7and is supplied to the option processor 45. Picture image data is supplied to the video-signal D/A conversion system 39.

[0055]After the picture image data supplied to the video-signal D/A conversion system 39 is changed into the video signal of an analogit is supplied to the video-signal-outputs processor 40. In the video-signal-outputs processor 40after the inputted video signal is encodedit is outputted. The outputted video signal is displayed on the display etc. which are not illustrated.

[0056]On the other handthe additional information supplied from the regenerative data processor 31 is supplied to the record data processing system 24 of a recording systemand it relates with picture image data and voice data when change is detectedand is made to record on the recording medium 5 in the option processor 45. It enables this to search the image and sound in the time of an image changing based on additional information. That isadditional information (ID) will be recorded per framethe field which describes the motion vector of a video change detection result and a photographic subject will be providedand a detection result will be described by those fields so that it may mention later. Thereforethe image and sound of a portion from which picture image data changed can be searched by referring to the field where the motion vector of a video change detection result and a photographic subject is described.

[0057]After an expansion process is performed and the voice data supplied to the audio signal zone expansion process system 41 is changed into the original audio signalit is supplied to the audio signal detection control system 42. Change of voice data is detected [in / at least in the level variation detection block 61 and L-R which were shown in drawing 5 / the phase reference detection block 62 and the spectrum difference detection block 63] in the audio signal detection control system 42.

[0058]As mentioned abovein the level variation detection block 61voice data is detectedthe level of inter-frame voice data is comparedand a comparison result is supplied to the detection judgment part 64. And when the difference beyond a predetermined reference value arisesit is judged by the detection judgment part 64 that voice data changed. When voice data is a stereothe level of a sound on either side is compared and a comparison result is supplied [in / at least in L-R / the phase reference detection block 62] to the detection judgment part 64. And when the level difference (volume difference) beyond a predetermined reference value is detectedit is judged by the detection judgment part 64 that voice data changed. In the spectrum difference detection block 63FFT calculates to the sample of the voice data in each framethe voice spectrum of each frame is detectedthe difference of a voice spectrum further inter-frame [each] is searched forand the detection judgment part 64 is supplied. And when the difference beyond a predetermined reference value is detected by the voice spectrum of each frameit

is judged by the detection judgment part 64 that voice data changed.

[0059]The decision result by the detection judgment part 64 is supplied to the option processor 45 as additional information as shown in drawing 7. The additional information from the audio signal detection control system 42 is supplied to the record data processing system 24 of a recording system is matched with the voice data which changed and it is made to record on the recording medium 5 in the option processor 45. It enables this to search the sound and image in the time of a sound changing based on additional information. That is additional information (ID) will be recorded per frame the field which describes a phonetic change detection result will be provided and a detection result will be described by this field so that it may mention later. Therefore the sound and image of a portion from which voice data changed can be searched by referring to the field where a phonetic change detection result is described.

[0060]The voice data supplied to the audio signal detection control system 42 is supplied to the audio signal D/A conversion system 43. After the voice data supplied to the audio signal D/A conversion system 43 is changed into the audio signal of an analog it is supplied to the voice signal output processor 44 and after being encoded it is outputted.

[0061]Thus the idle time when the usual record reproduction processing to the recording medium 5 is not performed is used. Change of the picture image data and voice data which were recorded on the recording medium 5 is detected and ID (additional information) including the information which shows that the image and the sound changed can be matched with the picture image data and voice data in the time of change being detected and can be recorded on the recording medium 5.

[0062]When recording the video voice signal inputted into the recording medium 5 from the video camera for surveillance etc. the additional information currently recorded on the recording medium 5 is referred to. From the data currently recorded on the video change detection result in additional information the photographic subject motion vector and the phonetic change detection result the frame from which the image and the sound are not changing is searched and a new video voice signal can be recorded on the portion.

Thereby only the picture image data and voice data in the time of either changing at least of an image and a sound can remain in the recording medium 5.

[0063]For example since an image and a sound when in the case of the image and sound which were photoed with the video camera for surveillance etc. a photographic subject moves or a sound changes have an important meaning it becomes possible by eliminating changeless image and sound and recording a new image and sound there to use the recording medium 5 efficiently.

[0064]Only when a video signal and an audio signal are recorded change of a video signal and an audio signal is detected and a video signal and an audio signal change a video signal and an audio signal can be recorded. By in that case the video-signal detection control system 16 and the audio signal detection control system 22 of a recording system which were shown in drawing 2. As it mentioned above with reference to drawing 4 and drawing 5 when change of picture image data and voice data is detected the additional information which shows that is supplied to the option processor 45 the picture image data and voice data at the time and additional information are matched and it is recorded on the recording medium 5.

[0065]Since only the image and sound at the time of changing an image and a sound can be recorded by this it is effective in a use which records the image photoed with the video

camera for surveillance etc. and the recording medium 5 can be used efficiently.

[0066] In a recording system also while reproducing and displaying the picture image data recorded on the recording medium 5 on the display which is not illustrated. When change of the video signal inputted from the camera system is detected and change of a video signal is detected, the display of a display can be compulsorily switched to the image into which it was inputted from the camera system.

[0067] That is, by switching an internal switch in the video-signal change system 14, the video signal from a camera system inputted from the camera-signal-processing system 12 is outputted selectively and is supplied to the video-signal A/D conversion system 15. In the video-signal A/D conversion system 15, the inputted video signal is changed into digital picture image data and is supplied to the video-signal detection control system 16. In the video-signal detection control system 16, as mentioned above with reference to drawing 4, change of the inputted picture image data is detected by the detection judgment part 54 for every frame, for example. And a detection result is supplied to the system controller 7. Thereby, the system controller 7 can recognize change of picture image data.

[0068] When change of a video signal has been recognized by the detection result from the video-signal detection control system 16, it is ordered the system controller 7 so that the video signal inputted from the camera system supplied via the video-signal change system 14 may be made to encode and output to the video-signal-outputs processor 40. According to the instructions from the system controller 7, the video-signal-outputs processor 40 encodes the video signal from the camera system supplied via the video-signal change system 14 and displays a corresponding image on a display.

[0069] The image can be displayed on a display when the video signal inputted from the camera system has changed, even if it is during reproduction of the picture image data recorded on the recording medium 5 by this.

[0070] Drawing 7 is a figure showing the example of a format of above-mentioned ID. The following items are described by ID. Namely, a record date time second () [YEAR MONTH DAY HOUR and] MINUTE SECOND, an input source (INPUT SOURCE). (For example, VTR, a tuner, a video camera etc.) channel numbers (CHANNEL), ID category (ID CATEGORY) (for example, a character, motion information), a video change detection result, a photographic subject, motion vector, a phonetic change detection result etc. are described.

[0071] Drawing 8 shows the recording form in case ID shown in drawing 7 is recorded. In drawing 8 (A), it is considered as the unit of one block of the VIDEO data and AUDIO data for one frame, and each block is recorded on the predetermined field to which the recording medium 5 continued physically or logically. And each ID which carries out frame correspondence is recorded on the predetermined field other than the field where the above-mentioned frame was recorded which continued physically or logically. On the other hand, in drawing 8 (B), it is considered as the VIDEO data for one frame, AUDIO data, and the unit of one block of ID, and each block is recorded on the predetermined field to which the recording medium 5 continued physically or logically.

[0072] Drawing 9 is a figure showing the display example of the retrieval picture which searches data when change of an image or a sound is detected based on ID recorded on the recording medium 5 and displays search results. In this example, time when change is detected and the concrete contents of that change are displayed. That is, in the case of this example, it is shown that an audio change was detected during the time 10:00 thru/or 10:03.

It is shown that the motion of a photographic subject was detected the period of the time 14:00 thru/or 14:22 and the time 02:34 thru/or during 02:38. It is shown that change of the luminosity of a photographic subject was detected the time 03:22 thru/or during 03:25. [0073] And by choosing the predetermined item of the detection result displayed on the retrieval picture using the mouse etc. which constitute the reproduction control signal input system 8 for example the picture image data and voice data corresponding to the selected item are reproduced and it can be displayed on a scope. That is which item of the retrieval picture displayed on the display was chosen based on operation of the reproduction control signal input system 8 judges the system controller 7 and it orders the recording medium 5 reproduction of the picture image data corresponding to the selected item and voice data. The recording medium 5 reproduces the picture image data and voice data corresponding to the selected item according to the instructions from the system controller 7 and supplies them to the regenerative data processor 31. Hereafter the image corresponding to the reproduced picture image data is displayed on a display like the case where it mentions above.

[0074] Thus only the picture image data and voice data of a portion in which change was detected are promptly and easily renewable.

[0075] In the case where change of the inputted video signal or audio signal is detected as mentioned above Since the image and audio signal which were inputted and additional information are continuously recorded on the recording medium 5 at the time of continuous recording mode (mode which records an image and a sound continuously irrespective of whether it changed or not) When change is detected the information which shows that change was detected is described in the predetermined field of additional information and this additional information is matched with the video signal and audio signal in the time of change being detected and can be recorded on the recording medium 5. At the time of intermittent recording mode (mode which records an image and a sound only when it changes). The information which shows that change was detected is described in the predetermined field of additional information and the additional information and the video signal and audio signal in the time of change being detected can be recorded on the recording medium 5.

[0076] The additional information the information which shows that change was detected was described to be via the modem network control section 76 When it transmits to other computers which were connected to the network or additional information is recorded on the field which can be accessed from the exterior and there is a transfer request from other computers the additional information can be transmitted to the computer.

[0077] When the video signal from two or more video cameras is inputted into the camera-signal-processing system 12 the picture image data which recorded two or more picture image data on the recording medium 5 simultaneously and was recorded on the recording medium 5 is reproduced one by one and change of picture image data can be detected. Similarly when the audio signal from microphones such as two or more video cameras is inputted into the mike input speech processing system 18 the voice data which recorded two or more voice data on the recording medium 5 simultaneously and was recorded on the recording medium 5 is reproduced one by one and change of voice data can be detected.

[0078] In television broadcasting the processing which detects change of the image by the video-signal detection control systems 16 and 38 and the processing which detects change

of the sound by the audio signal detection control systems 22 and 42 can be applied when detecting CM (commercials). It can also be applied when detecting change (scene change) of a scene. And when reproducing after that by recording detected change as ID it prevents from reproducing CM or the change of a scene can be searched.

[0079] By assigning the video signal from the video camera for surveillance etc. to a predetermined input channel in the above-mentioned embodiment it becomes possible to build the device provided with the search service which searches a monitoring function, the record reproduction function which carries out record reproduction of the usual program, the image from the video camera for surveillance and the image of the program inputted from other input channels. In that case the above-mentioned embodiment shall process simultaneously the video voice signal from two or more input channels.

[0080] In the above-mentioned embodiment although the video signal from one camera system shall be inputted into the camera-signal-processing system 12 the video signal from two or more camera systems is able to be inputted simultaneously.

[0081] In the above-mentioned embodiment DVD (digital versatile disc) a mini disc (MD) a (trademark) and the thing in which other random access is possible other than an optical disc a hard disk and a memory card can be used as a recording medium.

[0082]

[Effect of the Invention] According to the recording and reproducing device according to claim 1 and the recording and reproducing systems according to claim 7. With record to the inputted recording medium of 1 or two or more signals the signal recorded on the recording medium is reproduced independently. Since the information which shows change of a signal is matched with a signal and it was made to record on a recording medium when change of the reproduced signal was detected and change of a signal was detected change of picture image data and voice data is efficiently detectable by background processing.

[0083] According to the recording and reproducing device according to claim 8 and the recording and reproducing systems according to claim 9. When 1 or two or more signals are inputted change of the inputted signal is detected and change of the video signal which constitutes a signal is detected. Since the video signal was recorded on the predetermined recording medium and the sound was recorded on the recording medium while the level of the audio signal which constitutes a signal was beyond a predetermined reference value and the audio signal was changing within a predetermined base period a recording medium can be used efficiently.

[0084] According to the recording medium according to claim 10 at least Picture image data and voice data. The information which shows change of the information and voice data in which the information which shows change of picture image data and the information which shows change of voice data are recorded and change of picture image data is shown. Since it matches with picture image data and voice data and was made to be recorded the picture image data and voice data in the time of picture image data or voice data changing can be searched easily.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] It is a block diagram showing the example of composition of the 1 embodiment of the video voice recording and reproducing device which applied the recording and reproducing device of this invention.

[Drawing 2] It is a block diagram showing the example of composition of the recording system of the video voice recording and reproducing device of drawing 1.

[Drawing 3] It is a block diagram showing the example of composition of the reversion system of the video voice recording and reproducing device of drawing 1.

[Drawing 4] It is a block diagram showing the example of composition of the video-signal detection control systems 16 and 38.

[Drawing 5] It is a block diagram showing the example of composition of the audio signal detection control systems 22 and 42.

[Drawing 6] It is a block diagram showing the example of composition of the option processor 45 of drawing 3.

[Drawing 7] It is a figure showing the format of additional information.

[Drawing 8] It is a figure showing the recording form of record data.

[Drawing 9] It is a figure showing the display example of a retrieval picture.

[Description of Notations]

1 A record signal-processing system and 2 A signal detection system and 3 A regenerative-signal processor and 4 Signal detection system 5 A recording medium and 6 A recording control signal input system and 7. A system controller and 8 A reproduction control signal input system and 11. A video-signal processor 12 camera-signal-processing system and 13. A tuner system and 14 [An audio signal change system and 21 / An audio signal A/D conversion system and 22.] A video-signal change system 15 video-signal A/D conversion system and 16 A video-signal detection control system and 17 A video-signal-band compression processor 18 speech-signal-processing system 19 mike-input speech processing system and 20 An audio signal detection control system and 23 An audio signal bandwidth compression processor and 24. A record data processing system 31 regenerative-data processor 32 video-signal-band expansion process system and 38 [An audio signal detection control system 43 audio-signal D/A conversion system and 44.] A video-signal detection control system and 39 A video-signal D/A conversion system 40 video-signal-outputs processor and 41 An audio signal zone expansion process system and 42 A voice signal output processor and 45 An option processor 51 histogram difference detection block 52 inter-frame difference detection block 53 motion-vector detection block and 54 At least a detection judgment part 61 level-variation detection block and 62 L-R A phase reference detection block and 63. A spectrum difference detection block and 64 A detection judgment part 71 ID-discrimination control section and 72 A recording-medium interface 73 CPU 7. 5 A controlling-display part and 76 A modem network control section and 77 An I/O control unit and 74 Storage parts store
